Missouri Department of Natural Resources

40 years
Missouri Department of Natural Resources

WATER QUALITY COORDINATING COMMITTEE

Lewis & Clark State Office Building
LaCharrette Conference Room
1101 Riverside Drive
Jefferson City, Missouri

May 20, 2014

10:00 a.m.

MEETING AGENDA

Atrazine Registration Review and the Atrazine Ecological Monitoring Program: A Missouri Update – Mark White, Syngenta

Herbicide Contamination in Missouri Streams – Factors Affecting Transport and BMPs to Reduce It - Bob Lerch, USDA Agricultural Research Service

Nonpoint Source Management Plan Update – Greg Anderson, DNR, Water Protection Program

Other

Agency Activities

Meetings & Conferences

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MINUTES

Attendees:

Greg Anderson	DNR, Water Protection Program	Colleen Meredith	DNR, Soil & Water Conservation Pgm
John Johnson	DNR, Water Protection Program	Mike McKee	MO Dept. of Conservation
Robert Lerch	USDA - ARS	Rebecca O'Hearn	MO Dept. of Conservation
Trish Rielly	DNR, Water Protection Program	Jane Davis	DNR, Water Protection Program
Miya Barr	USGS	Mark White	Syngenta
Terri Brink	EPA	Mike Kruse	DNR, Water Protection Program
April Brandt	DNR, Soil & Water Conservation Pgm	Dan Downing	UMC Extension
Ken Tomlin	DNR, Water Protection Program	Darlene Schaben	DNR, Water Protection Program

Greg Anderson chaired the meeting.

Atrazine Registration Review and the Atrazine Ecological Monitoring Program: A Missouri Update –
Mark White, Syngenta
PowerPoint Presentation

Mark is a Regulatory Stewardship Manager for Syngenta. He gave some history of the Atrazine Reregistration. The original Special Review for the triazines was initiated in 1994. As part of the registration process, they evaluate potential cancer risks in drinking water and other exposures. In 2000, the Environmental Protection Agency (EPA) determined that atrazine is not likely to cause cancer. In 2006, EPA completed reregistration of atrazine and the other triazines. EPA initiated "comprehensive scientific reevaluation of the potential human health impacts of atrazine" in October 2009. On June 26, 2013, EPA initiated the "registration review" of atrazine, simazine and propazine. The Docket for the workplan opened with a 60-day comment period in June 2013 with a projected completion date in 2016. Mark thought there was no request for new data or new scientific studies because the Special Review had just been completed and most of the science issues were up to date.

A chart was shown on the maximum contaminant level (MCL) for atrazine on human health conclusions and standards and he talked about some of the endpoints that came from the special review process. As part of the registration review process, EPA has looked at the science and talked about the potential of raising the MCL for atrazine in drinking water. Since 2010 the World Health Organization looked at multi-year assessments and revised their recommended limit from 1 part per billion (ppb) to 100 ppb.

Atrazine labels have been revised several times over the years. The rates have also been revised several times. Two pounds per acre is the maximum that can be used on a field. Atrazine was the first product to tie rates directly to conservation practices and few other herbicides have similar requirements. There are setbacks and no application zones which farmers have to adhere.

Mark talked about what was going on in Missouri and several other states on the atrazine ecological monitoring program. This was a caveat that come out of the reregistration. Syngenta and other registrants were to enter into an agreement and monitor several streams in different states for ecological effects to help EPA determine the appropriate level of concern. Monitoring started in 2004; 20 more sites were added in 2005. Seven sites with corn production were retained in the program at the end of 2009 and 25 new sites were added in 2010 at EPA's request. The sampling period ran from early April to July or early August. The science-based approach successfully selected high runoff vulnerability watersheds for this atrazine monitoring program. Most detections are short-lived. The Watershed Regression for Pesticides (WARP) (national) model was used to select sites in the corn/sorghum production states. There were originally five sites in Missouri. Currently, there are four sites in northeast Missouri, two in Iowa, one in Nebraska, one in Louisiana, and one in Texas that are still in the program. EPA's website states that a 60-day average of 10 ppb is the trigger using a PATI model. Mark showed a graph of maximum atrazine 60-day rolling average concentrations for the time period 2010-2013. They have been actively working with two of the sites in Missouri in a stewardship program. The results showed well below 10 ppb. They have started working with farmers in the other two sites, as well as the Nebraska site, to initiate stewardship programs. Louisiana and Texas have different farming practices and are the most challenging but they have just started working with them as well. The South Fabius River Watershed site shows a declining trend of atrazine residue concentrations. Mark felt this site is a success story and the most studied watershed and longest term in the program. All the sites in Missouri have high claypan soils, highly prone to runoff and very little infiltration of water. Approx. fifty percent of the acres are in crop production. He displayed different graphs for the four years that showed atrazine, rainfall, and flow amounts. Results were also shown for the other Missouri sites: Youngs Creek Watershed (also known as Goodwater Creek); Honey Creek Watershed; and West Fork Cuivre River Watershed. The study is looking at ecological effects, primarily algae.

Product labels tell you what you are allowed and not allowed to do. Where soil has less cover, a maximum of 1.6 lbs. per acre is allowed. If the soil is not highly erodible, a maximum of 2.0 lbs. per acre is allowed. Atrazine is a restricted use pesticide, which means only a certified applicator can make a purchase. Use of atrazine requires voluntary cooperation of stakeholders to identify best management practices (BMPs) to reduce atrazine load in the watersheds. If successful, atrazine will continue to be used in the watershed. If unsuccessful and atrazine shows up in the streams, it may require a label change or discontinued use.

Information received from these watersheds help guide their education efforts. In the time period of 2009-2013, they have been successful in bringing down the rolling averages to be well below 10 ppb. They found it takes a full year to gain the trust and learn that the BMPs do benefit them. Mark showed a graph of crop distribution in the watershed. The corn and soybean acres remained steady over time. They have seen a decline in atrazine application rates and usage. Producers have been splitting the applications between usage before emergence and when crops get up to twelve inches tall. This is better for runoff and in missing rain events. Farmers are also dealing with weed resistance but atrazine still seems to be very effective. One thing they have noticed changing in the watershed is more farmers are shifting to minimum-till. No-till will probably be adopted but minimum till would still be effective.

Mark said they have developed field vulnerability maps, depth to claypan, and percentage of slope and made them available to retailers and producers. This helps to guide them with farming practices.

Herbicide Contamination in Missouri Streams – Factors Affecting Transport and BMPs to Reduce It –
Bob Lerch, USDA Agricultural Research Service
PowerPoint Presentation

Bob mentioned that his and Mark's work overlaps and reinforces some of the science behind the selection of many of the sites. There are four general factors in controlling herbicide transport: intrinsic (soil & hydrologic properties), herbicide (chemical properties), climate (precipitation and temperature), and anthropogenic (land-use and herbicide management). Samples were collected at 21 United States Geological Survey (USGS) monitoring stations in northern Missouri between April 15 and July 15 from 1997 to 1999. Samples were analyzed for six commonly used corn and soybean herbicides and four triazine metabolites. Loads were computed by using linear interpolation of concentration data multiplied by daily discharge. Land use includes corn, soybeans, and sorghum production. Using this information they developed a watershed vulnerability map showing the differences in transport. The claypan areas became the focus.

Bob said they started doing basin-scale monitoring in the Salt River Basin (heart of the claypan region). Mark Twain Lake is the major public water supply in the region. They monitored 13 stream sites from 2005-2011 and measured discharge, rainfall, herbicides, nutrients, and sediment. Maps of atrazine transport were shown to compare a dry year (2005) and wet year (2008). He talked about worst and best case scenarios of critical loss periods in Goodwater Creek watershed. After some research they developed an atrazine cumulative vulnerability index (CVI) to estimate for high risk or low risk for atrazine transport. The CVI accounts for atrazine application timing, occurrence and timing of runoff events, and dissipation of atrazine in soils. The southeast corner of Goodwater Creek watershed is the area used for the watershed-scale monitoring. Monitoring of discharge, sediment rainfall, and weather has continued for 43 years. Nutrients and herbicides monitoring was added 22 years ago. The area is flat to gently rolling topography with claypan soils within the top 25 cm of soil surface. They used the Watershed Regression for Pesticides (WARP) (national) model to show the difference between modeled and observed atrazine concentrations. Pattern of high atrazine concentrations follows spring runoff events suggested that interflow (flow over the saturated claypan) may be the cause. Persistent, high atrazine concentrations resulted in exceedance of proposed EPA ecological criteria in 10 of 15 years. Bob felt the hydrology is driving the prolonged high concentrations of atrazine, which is an inherent feature of claypan landscape.

In identifying vulnerability in space and time and moving toward targeting, they first did field-scale risk assessments on observed transport, claypan index, and conductivity claypan index (CCI). Bob said that with corn and soybean yields, the CCI assessment matches the observed more closely. Some areas eroded more with more runoff and loss of chemicals, loss of nutrients and sediment, showing the farmer where in his field he is losing money. Bob showed a map of claypan index to show vulnerability in a watershed scale. The areas with the most slope along stream channels is the most risk of runoff. Maps were also shown to display risk of atrazine loss in runoff over time.

Bob showed a picture of their Field 1 Research Site showing cropping system effects on claypan soils and the incorporation of soil applied herbicides, which includes 5 wells, a weather station, a weir and auto sampler, and approx. 30 runoff plots with different cropping systems: CS1 – mulch-till, corn-soybean rotation; CS2 – no-till, corn-soybean rotation; CS4 – precision nutrient application; no-till, corn-soybean rotation; CS5 – no-till, corn-soybean-wheat rotation; and CS6 – Continuous grass (CRP). They used CS1, CS2 and CS5 no-till methods to compare. Atrazine runoff was higher with the no-till system. The no-till method showed excellent for reducing sediment runoff.

In a watershed to field comparison, it shows that incorporation of soil applied herbicides is the most effective BMP for reducing losses in runoff. No-till is very effective for erosion control, does not reduce runoff volume, and greatly increases atrazine losses in runoff. This creates a claypan soil dilemma. Incorporation increases erosion, but it decreases herbicide loss. Existing tillage implements, such as roller harrows, can control both erosion and soil-applied herbicide losses.

Other BMPs they have researched include reducing herbicide and veterinary antibiotic losses from agroecosystems using vegetative buffers of four different treatments - tall fescue, hedge plus tall fescue, native and control. These were tested using atrazine, glyphosate, and metolachlor. Bob said that any buffer will help with load reductions.

Plans for future studies include claypan hydrology (relating water chemistry and stream recharge sources to contaminant transport); cropping systems and bioenergy crops (management systems to reduce contaminant transport and impact of bioenergy crops on soil and water quality); and phytoremediation (vegetative buffers - effects of concentrated flow and manure; herbicide degrading phytochemicals). He talked about some of what they have already started on these studies. They are still at an exploratory point.

In answer to a question, Bob said the buffers are equivalent to an edge-of-field buffer. Bob hoped this presentation helped to explain why Syngenta was working in their selected sites. The claypan soils have been a problem. EPA has figured this out but not figured out what they want to do about it. Syngenta has been a good partner.

Nonpoint Source Management Plan Update – Greg Anderson, DNR, Water Protection Program
PowerPoint Presentation

The Nonpoint Source Management Plan (NPSMP) is a large document covering different aspects of nonpoint source issues and partners, and there are a lot of requirements associated with it. The Department of Natural Resources receives their nonpoint source program grant to use for developing total maximum daily loads (TMDLs), monitoring, staffing, subcontracts, and subgrants. EPA requires the NPSMP to be rewritten every five years and updated on an annual basis. With new national guidance and requirements in the Section 319 nonpoint source management program, the Government Accountability Office (GAO) & Office of Management and Budget (OMB) are requiring 50% of state programs to have updated plans in 2014. Missouri's NPSMP was last updated in 2002. GAO & OMB want a greater focus on measureable nonpoint source improvements and greater EPA oversight and cost/benefit. There would be disincentives for poor program management. The state plan is intended for the entire state with many partners involved. Greg said for Missouri, they want to improve internal processes and become more selective about how funds are spent, and find more effective ways to proclaim partnerships and successes.

NPSMP Mission: Preserve and protect and improve the quantity and quality of the water resources of the state from nonpoint source impairments using a collaborative watershed approach.

Components of the NPSMP include: goals and objectives, prioritization, funding, milestones and schedule, partners and collaboration, and evaluation. Long-term goals are to abate known water quality impairments from nonpoint source pollution and prevent significant nonpoint source threats to water quality from present and future activities. The mid-term goal is to achieve aquatic life use attainment in 50% of nonpoint source pollution impaired water bodies by 2030. Short-term goals include: enhance water quality monitoring throughout the state and increase the amount of data collection to assess watershed conditions, water quality trends, and identify areas of concern; assess watersheds, water quality data and other criteria to identify priority watersheds, critical areas and categorize areas for outreach, planning or implementation activities; lead local development of watershed based plans or acceptable alternatives in priority watersheds; assist with and track implementation of nonpoint

source based restoration and protection efforts to restore water quality and watershed resources; promote and encourage high impact and coordinated nonpoint source education efforts throughout the state; and examine and improve nonpoint source program administration processes and fiscal procedures to ensure a cost effective program that leverages and builds on other nonpoint source efforts and maintains emphasis on water quality improvements.

Public comments as well as EPA comments will be reviewed and the plan revised as necessary. The plan must be approved by EPA. The Department will request a Certification from the Attorney General's Office to certify that the state has the ability to implement the plan. Greg said the plan will then be presented to the Clean Water Commission before further distribution.

There will be a public meeting on June 9 at the Lewis & Clark State Office Building. The comment period ends July 8, 2014. The previous NPSMP as well as the new draft NPSMP are located on the web at http://www.dnr.mo.gov/env/wpp/nps/mgmtplan/index.html. Greg can be contacted by phone at (573) 751-7428 or by e-mail at greg.anderson@dnr.mo.gov.

Meeting adjourned.